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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Jerry L. Turney et al.	Examiner:	J. R. Jastrzab
Serial No.:	10/034,132	Group Art Unit:	3762
Filed:	28 December 2001	Docket:	P-9372.00

Title: MECHANICAL METAPHOR FOR REPRESENTING PARAMETER CONSTRAINTS GRAPHICALLY FOR MEDICAL DEVICES

DECLARATION UNDER 37 CFR 1.131 ANTEDATING A REFERENCE

I hereby declare the following:

1) I am currently and correctly named as an inventor in the pending patent application entitled MECHANICAL METAPHOR FOR REPRESENTING PARAMETER CONSTRAINTS GRAPHICALLY FOR MEDICAL DEVICES, Serial number 10/034,132.

2) The invention disclosed within the above-referenced patent application was conceived of by me and the other named inventors prior to September 1998.

3) A written description of the invention is present in certain invention disclosure form and related documents of mine with a date of entry prior to September 1998.

4) An Invention Disclosure Form was completed that described the invention and was submitted to the Medtronic, Inc. legal department for consideration prior to September 1998.

5) The invention was not publicly disclosed or offered for sale prior to the filing date of the present patent application.

6) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and

further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Date: _____

_____
Jerry L. Turney

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INVENTION DISCLOSURE FORM

Please complete this form for any new ideas and submit it to Brad Pedersen for patent consideration. The information provided on this form may be used to prepare a patent application that will be signed by the inventors. Care should be taken in accurately completing this form and in providing full information concerning any relevant prior art. Please be aware that any false statements made in obtaining a patent may jeopardize the validity of any patent that may be granted for this invention. If you have any questions, please contact Brad Pedersen, X 409.

1. **TITLE** - Provide a one-line descriptive summary of the invention. Where possible use any key words or phrases that would be helpful in searching or sorting information relevant to this invention.
   Mechanical metaphor for representing parameter constraints graphically.

2. **INVENTORS** - List the names of all inventors and the full names and addresses of any inventors outside Angeion.

   Name Jerry Furney Address [illegible]

3. **BACKGROUND** - Indicate the approximate dates, if any, that the invention was (a) conceived, (b) successfully reduced to practice, i.e. built, demonstrated or used, (c) offered for sale or sold to a third party, and/or (d) publicly used or demonstrated.

   (a) Conception of idea: [illegible]
   (b) Reduction to practice:
   (c) Sale of invention:
   (d) Public use of invention:

4. **PROBLEM SOLVED** - Briefly state the problem(s) that are solved by this invention, or the advantage(s) that this invention has over the current practice in this field.
   Some ICD parameter values are constrained by other values. A method is needed to show the user the constraints and to keep the user from entering values that violate the constraints. A mechanical metaphor using sliders is used.

5. **DRAWINGS** - List and attach any drawings, figures, or photographs which are helpful in describing or understanding the invention.

Patent Disclosure

6. **DESCRIPTION** - Describe in an attached document the essential elements of the invention and how the invention works. For an apparatus invention, list the significant physical elements and their relationships. For a system or method invention, list the significant functions of the system and how each is accomplished. For a programming invention, provide a flowchart or block diagram and describe what each module does.

7. **PATENTS** - Are you presently aware of any patents that are generally related to the subject matter of your invention? ____YES ✓NO If YES, please list hose patents below.

8. **BOOKS** - Do you have in your personal library or are you aware of any books including textbooks or reference books, that are generally related to the subject matter of your invention? ✓YES ____NO If YES, please identify the relevant pages from each volume which you consider to be pertinent to understanding your invention.
"MFC Programming from the Ground Up" pages 300-308 describes the use of an unconstrained slider control.

9. **PERIODICALS** - Are you aware of any specific articles in periodicals or journals, trade magazines or newspapers that are generally related to the subject matter of your invention? ___YES ✓NO
If YES, please identify the periodical, relevant articles and pages from each volume which you consider to be pertinent to understanding your invention.

10. **COMPETITIVE PRODUCTS** - Are there any other products which you perceive as competitive products to your invention? ____YES ✓NO
If YES, please identify any written material that you are aware of regarding those products. For example, written material may include reference manuals, promotional literature or demonstration materials.

Witnessed: The Witnesses whose signatures appear below have read and understood this Invention Disclosure.

Witnesses:

Witness Date

Witness Date

Inventors:

Inventor Date

Inventor Date

Inventor Date

Inventor Date

Intellectual Properties Office ONLY

Short Title MECHANICAL BAR GRAPH METAPHOR

Group SOFT Category CON

Status In Prep-3

Angeion Docket No. INP180

Mechanical Metaphor for Parameter Constraints

Some of the programmable parameters for the ICD are constrained by equality and inequality relationships. For example, in the 2100 the following constraints exist between the detection rate parameters

- High Zone Rate > Mid Zone Rate (A<<V)
- High Zone Rate > Mid Zone Rate (A=V)
- High Zone Rate > Mid Zone Rate (A>>V)
- Mid Zone Rate (A<<V) > Low Zone Rate (A<<V)
- Mid Zone Rate (A=V) > Low Zone Rate (A=V)
- Mid Zone Rate (A>>V) > Low Zone Rate (A>>V)
- Low Zone Rate (A<<V) > Brady Pacing Rate
- Low Zone Rate (A=V) > Brady Pacing Rate
- Low Zone Rate (A>>V) > Brady Pacing Rate
- Brady Pacing Rate ≥ Brady Pacing Hysteresis

Constraining the values of a set of programmable parameters can, in general, confuse a user, because he/she may not understand how the constraints interact. One way to allow the user to understanding the interaction is to provide a simple mechanical metaphor. In *Figure 1: Mechanical Metaphor for Representing* Parameter Constraints a set of sliders indicates the values of the interrelated parameters. The sliders have a range of values represented by their slot length, i.e., they are free to travel up and down the length of the slot with each position corresponding to a different value of the parameter. The sliders are also designed to constrain one another. Unlike a normal user interface slider, these sliders have extensions that constrain the movement of other sliders.

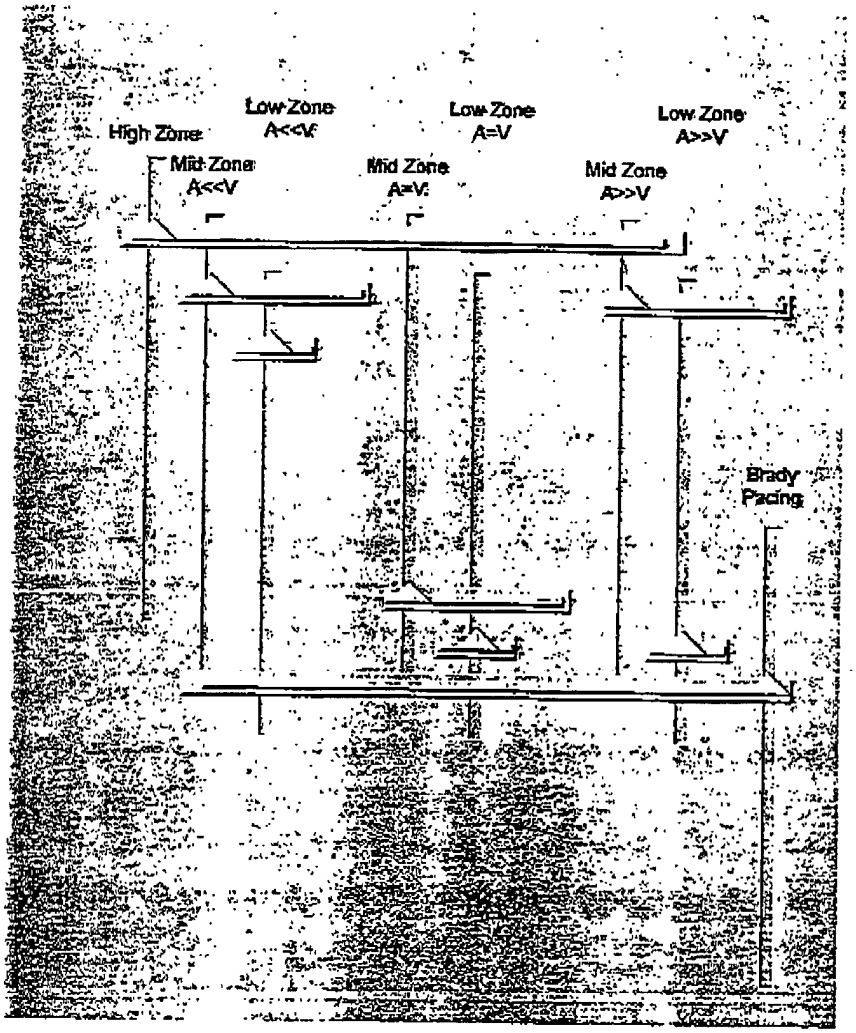

Figure 1: Mechanical Metaphor for Representing Parameter Constraints

For example if the Brady Pacing Rate Slider in the above Figure were to be moved upward, it would cause all of the sliders immediately above it to also move upward, preserving the inequality constraint (See Figure 2).

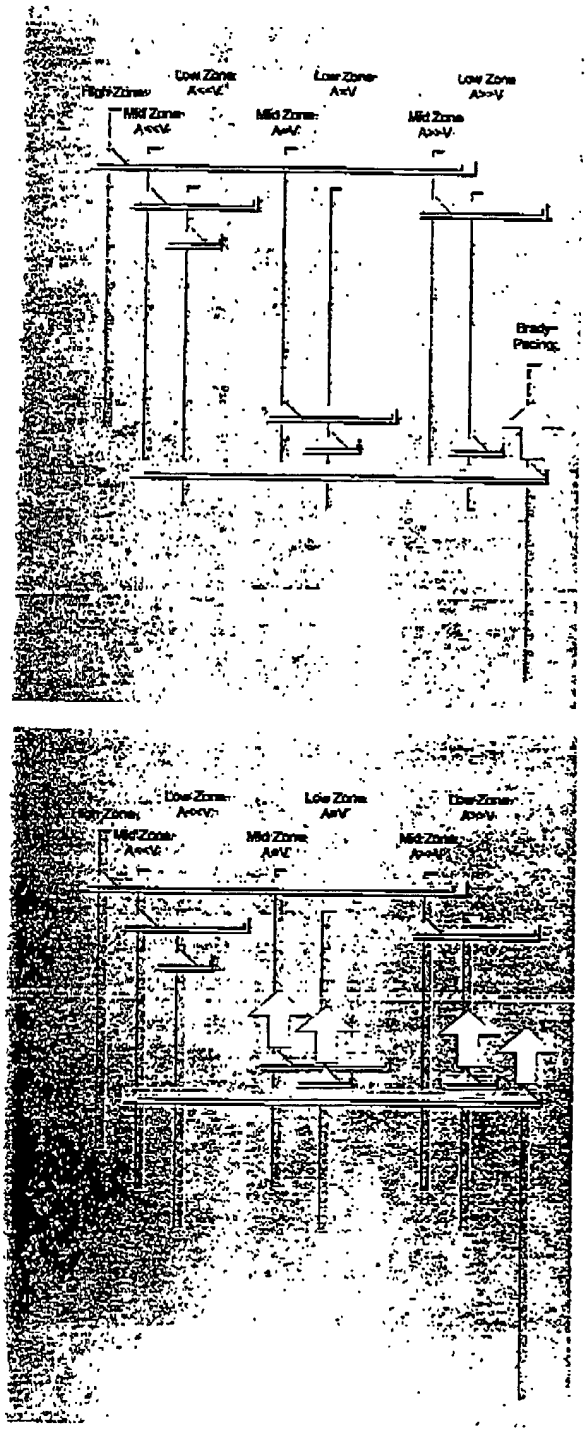

Figure 2: Changing a Constrained Value Causes Constraining Values to Change

For constraints involving a "greater than or equal to" inequality (i.e., ≥), the lower slider is allowed to overlay the constraining slider. Any further movement, however, will cause the constrained slider and the constraining slider to move. For example in Figure 3, the Brady Pacing Hysteresis slider is moved up and collides with its constraining slider Brady Pacing Rate. Both then move up together.)

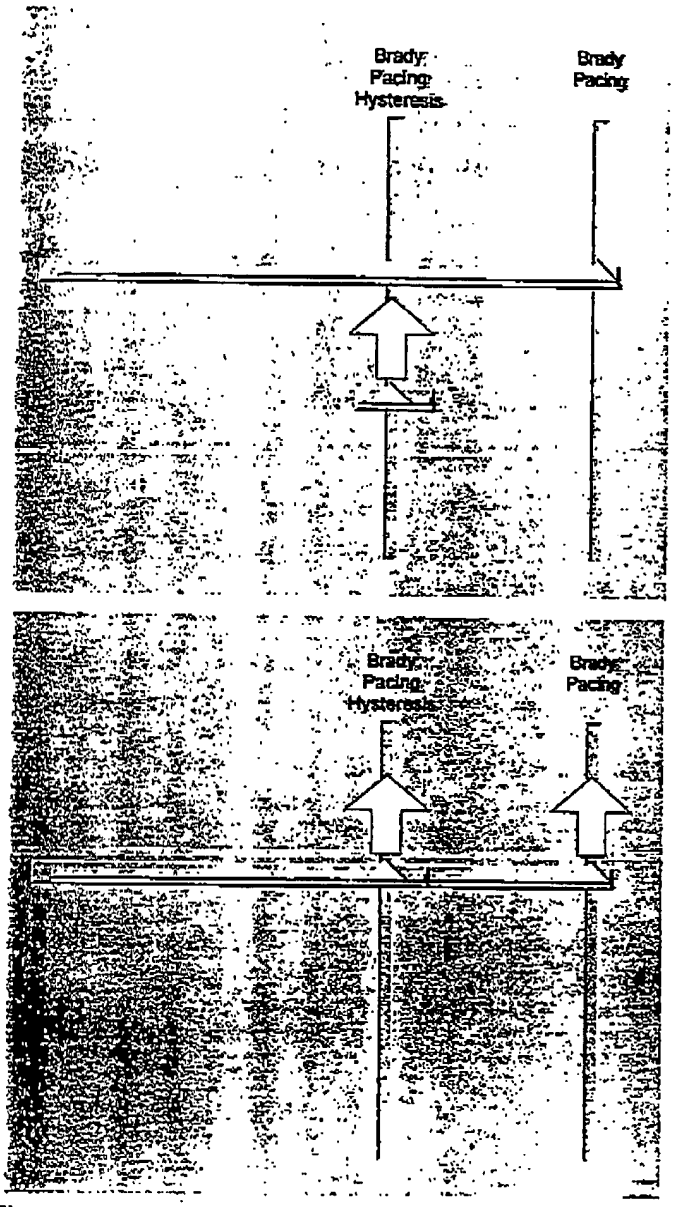

Figure 3: Representing a "≥" constraint